

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	James Hayden Brownell	Confirmation No.	8895
Serial No.	10/529,343	Group Art Unit:	2828
Filed:	March 25, 2005	Examiner:	Stafford, Patrick
For:	FREE ELECTRON LASER, AND ASSOCIATED COMPONENTS AND METHODS		

October 15, 2008

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

In accord with 37 C.F.R. 41.37, Appellant hereby files an Appeal Brief in support of his Appeal in the above-identified matter. A Notice of Appeal was submitted July 17, 2008, along with a Pre-Appeal Brief Request for Conference and Review. This Appeal Brief is submitted within one month of the Notice of Panel Decision from Pre-Appeal Brief Review, mailed September 15, 2008, and is thus considered timely filed under 37 C.F.R. 41.37.

The fee for the Notice of Appeal was paid on July 17, 2008. The Commissioner is hereby authorized (pursuant 37 C.F.R. 41.20(b)(2)) to charge the \$270.00 fee for this Appeal Brief to Deposit Account No. 12-0600. No additional fees are believed due; however, if any further fee is deemed necessary to make this submission both timely and complete, please charge the deposit account identified above.

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REAL PARTY IN INTEREST.

The real party in interest is the Trustees of Dartmouth College, located at 11 Rope Ferry Road, Hanover, NH 03755. The full right, title, and interest in this application is accorded to the Trustees of Dartmouth College, as indicated in the assignment recorded on March 25, 2005

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences currently known to Appellant that will directly affect, be directly affected by, or have a bearing on the decision to be rendered by the Board of Patent Appeals and Interferences in the present appeal.

STATUS OF CLAIMS

Claims 2-14 and 16-17 are pending in the present Application, with claims 2, 10-11, 14, and 16 being independent.

Claim 10 was allowed by the Panel Decision from Pre-Appeal Brief Review mailed September 15, 2008.

Claims 1, 15, and 18 were cancelled during prosecution.

Claims 11-14 and 16-17 were withdrawn during prosecution, although independent claim 2 is generic to each of the independent claims.

Claims 2-9 are original (without amendment during prosecution), and the rejection of claims 2-9 is being appealed herein.

STATUS OF AMENDMENTS

An amendment filed June 4, 2007, responsive to a non-final Office Action mailed May 4, 2007, was entered.

An amendment filed December 21, 2007, responsive to a non-final Office Action mailed September 21, 2007, was entered.

An amendment filed May 21, 2008, responsive to a final Office Action mailed March 21, 2008, was not entered. This amendment amended only a single claim for a non-substantive typographical error, and made no other amendments to the claims. Although the Amendment should have been entered for addressing informalities only, only the arguments made in the Amendment have any bearing on this appeal.

SUMMARY OF CLAIMED SUBJECT MATTER

With respect to independent claim 2, a grating horn (element 100, 150; see Figs. 3, 6, for example) comprises a flat base (elements 108, 156; Figs. 3A-B) and a pair of grating elements (elements 152A-B, for example) attached to the base (see Figs. 3, 6), each of the grating elements being ruled with a grating period (see Fig. 3B, for example), the grating elements oriented in phase (see paragraph [0036] of the present Specification, for example), and in substantial symmetry about a normal to the flat base such that an electron beam interacting with the grating elements produces Terahertz radiation. (See paragraph [0044] and Figs. 1, 6, for example).

With respect to claim 3, the grating elements may form a V-groove and vertex to the flat base (see paragraph [0036] of the present Specification, for example).

With respect to claim 4, each of the grating elements may be ruled perpendicular to a face of the grating element (see paragraph [0040] of the present Specification, for example).

With respect to claim 5, the vertex may intersect the flat base (see Fig. 6C, for example).

With respect to claim 6, the vertex does not intersect the flat base, wherein rulings of the grating elements extend between the vertex and the flat base (see paragraph [0039] of the present Specification, and Fig. 6B for example).

With respect to claim 7, the vertex may comprise a flat portion (see paragraph [0039] of the present Specification, Fig. 6C, element 161, for example).

With respect to claim 8, rulings of the grating elements may be parallel to the flat base (see Fig. 3A, for example).

With respect to claim 9, each of the grating elements may form a bevel edge, wherein each of the grating elements is ruled between the bevel edge and the flat base (see paragraph [0039] of the present Specification, Figs. 3, 6, for example).

GROUND FOR REJECTION TO BE REVIEWED ON APPEAL

I. The rejection of claims 2-5 and 7-9 under 35 U.S.C. 103(a) as being unpatentable over Kramer (U.S. 4,852,956) in view of Walsh (U.S. 5,263,043).

II. The rejection of claim 6 under 35 U.S.C. 103(a) as being unpatentable over Kramer in view of Walsh, and further in view of Hamada (U.S. 4,972,075).

ARGUMENT

I. THE REJECTION OF CLAIMS 2-5 AND 7-9 UNDER 35 U.S.C. 103(a) BASED UPON KRAMER IN VIEW OF WALSH SHOULD BE REVERSED.

Claims 2-5 and 7-10 improperly stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer (U.S. 4,852,956) in view of Walsh (U.S. 5,263,043). The rejection acknowledges that several elements of the claims are not taught or suggested by the prior art, but refuses to give reasonable consideration to these clearly-recited elements.

A. A *Prima Facie* Case of Obviousness Has Not Been Established.

Section 2143.03 of the MPEP requires that "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). In the present case, however, this burden has not been met in the outstanding obviousness rejection. At least two recited features of the grating horn of independent claim 2 have been given no patentable consideration with respect to the two cited prior art references, neither of which teaches or suggests such claimed features.

1. Neither of the cited references, whether taken alone or together, teaches or suggests a grating horn.

The rejection implicitly admits that neither of the cited references teaches or suggests a grating horn, but merely refuses to consider this feature of the claim on the grounds that that "a recitation a grating horn (sic) has not been given patentable weight because the recitation occurs in the preamble." (See page 2, final paragraph of the March 21, 2008 Office Action). Although the Examiner is correct that the literal words "A grating horn" appear only in the preamble, when *taken as a whole*, the claim nevertheless is a grating horn. Neither of the cited references have any relation to grating horns, nor could they be simply used as grating horns, and therefore neither is analogous to the pending claims.

The Board should also take note here of the improper Restriction of the claims, noted above. The propriety of this Restriction is not an issue that is before this Board, but the Board should nevertheless find the relationship between the pending claims and the restricted claims highly significant. Independent claims 2 and 11, for example, differ only in that claim 11 is a system claim that features all of the limitations of claim 2 (claim 11 recites "a grating horn" in the body of the claim), plus an electron beam generator. Claim 2 though, affirmatively recites an electron beam within the body of the claim, and the Examiner has never explained how the inclusion of an electron beam generator renders claim 11 patentably distinct from claim 2, which already features the electron beam. According to the rationale presented in the rejection, claim 11 would have been allowable merely because the words "a grating horn" appear outside of the preamble of the claim. Claim 2 is clearly generic to claim 11, and the one claim should not be rejected while the other is clearly patentable over the same references.

It was therefore error to have dismissed the grating horn limitation of claim 2 only because of its presence in the preamble. "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165-66 (Fed. Cir. 1999). A "preamble may provide context for claim construction, particularly, where ... that preamble's statement of intended use forms the basis for distinguishing the prior art in the patent's prosecution history." *Metabolite Labs., Inc. v. Corp. of Am. Holdings*, 370 F.3d 1354, 1358-62, 71 USPQ2d 1081, 1084-87 (Fed. Cir. 2004). Therefore, the "grating horn" language of claim 2 should have been given full patentable consideration.

Had such consideration been given, it would have been apparent that the proposed combination of references did not establish a *prima facie* case of obviousness, because neither reference teaches or suggests a grating horn. "[C]lear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art *transforms the preamble into a claim limitation* because such reliance indicates use of the preamble to define, in part, the claimed invention." *Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d at 808-09, 62 USPQ2d at 1785. (Emphasis added). Preamble language must be given patentable consideration when it does not merely "state a purpose or an intended use of the invention,

but rather discloses a fundamental characteristic of the claimed invention that is properly construed as a limitation of the claim.” *Poly-America LP v. GSE Lining Tech. Inc.*, 383 F.3d 1303, 1310, 72 USPQ2d 1685, 1689 (Fed. Cir. 2004). A grating horn is such a fundamental characteristic of the invention.

The Examiner has at least implicitly acknowledged, as a matter of fact, that neither of the two cited references could actually function as a grating horn, whether taken alone or together. When a prior art combination is not capable of performing the intended use as recited in the preamble, then the combination cannot meet the claim. *See, e.g., In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). In particular, the device of Kramer has the purpose of reducing distortion in light scanning applications, which is different from some of the main purposes of a grating horn, such as light generation with an electron beam, conversion of incident light into slow-waves bound to the grating surface, magnification of signals, and/or light condensation. Walsh similarly fails to teach or suggest grating horn functionality, whether considered alone, or in combination with Kramer. Because neither reference – alone or together – could perform as a grating horn, the proposed combination thus cannot read upon the claims, and therefore the very assertion of obviousness is deficient on its face.

It is well established that a claim, when taken as a whole, can be more than the mere sum of its individual parts. In the classic example, a stool could be comprised of nothing more than a flat disk and three upright rods. The “stool” limitation though, would only appear in the preamble, and the “plates” and “rods” (each known separately in the art) in the body of the claim. A combination of one reference that taught plates with another that taught rods would not, however, read upon a seating apparatus. The “stool” limitation in the preamble would have to be given full patentable consideration. Without the benefit of the new application, there would have been no teaching or suggestion to combine a plate and a rod together to create a seating apparatus, regardless of whether plates and rods may have both been known in the art. The same analogy applies to the present case. The mere picking and choosing from the art of elements from claim 2 would not suggest a grating horn. Accordingly, this Board should find that the rejection demonstrates a clear use of impermissible hindsight, and should be withdrawn.

Claims 3-9 all depend directly or indirectly from independent claim 2, and therefore include all of the features of the base claim, plus additional features. Accordingly, this Board

should find that claims 3-9 should all be in condition for allowance for at least the reasons discussed above with respect to independent claim 2.

2. Neither of the cited references, whether taken alone or together, teaches or suggests the recited phase orientation of the claimed grating elements.

Despite the fact that neither reference, alone or together, could read upon a grating horn, the Examiner acknowledges that neither reference also fails to teach or suggest a pair of grating elements being oriented in phase. Instead, the rejection merely asserts that Kramer teaches a pair of grating elements that "are adjustable," and that therefore such elements are "*capable* of being arranged in phase." (Page 3, line 3 of March 21, 2008 Office Action, emphases added). In other words, the Examiner has only asserted that the claimed grating element limitations are *possible* – though not actually taught or suggested – from the prior art. The rejection submits no evidence, however, to support the conclusory assertion. The only “evidence” in the record in support of the claimed orientation of the pair of grating elements is the Examiner’s own unsupported conclusory opinion that the limitation is possible.

The record does not indicate, however, that the claimed in-phase orientation is actually possible from the teachings of either cited reference. The Examiner admits that only Kramer – and not Walsh – discusses any orientation of grating elements, but even then, the Examiner has acknowledged that Kramer only teaches that the elements are “adjustable.” The reference does not say *how* adjustable is the orientation of its elements, or more particularly, that the elements can be adjusted to be in phase while the device is operational. In fact, the Board can see that Kramer never even discloses or suggests phase orientation. Only the *structural* orientation of Kramer’s grating surfaces is described, and not their phase orientation. Accordingly, the “adjustability” of the grating elements from Kramer is clearly irrelevant to the present claims.

According to the present Application, the orientation of the phase between the two grating elements is significant because different phase orientations can produce different and distinct emission patterns. Kramer is entirely silent regarding any material factors of the phase orientation. Walsh is relied upon merely for its disclosure of gratings with radiation in the FIR (Terahertz) range. Walsh is equally silent regarding any phase orientation between the grating elements themselves. Therefore, the assertion that the *structural* adjustability of Kramer will somehow automatically determine the phase orientation of the grating elements

is yet another conclusory opinion by the Examiner that has no evidentiary support in the record. Obviousness cannot be established or maintained on such a basis.

Although the standards to establish obviousness have been more fluid recently, the existing standards have not been eliminated. Section 2143.01 of the MPEP, for example, still articulates that obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006). However, citing *Kahn* specifically in *KSR v. Teleflex*, 550 U.S. ___, 82 USPQ2d 1385 (2007), the Supreme Court of the United States held that such “rejections on obviousness *cannot be sustained by mere conclusory statements*; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” 550 U.S. at ___, 82 USPQ2d at 1396 (emphases added). This reasoning-with-rational-underpinning is the underlying factual inquiry as to whether references can be combined, and this factual inquiry must be based on objective evidence of record, that is, evidence capable of review and rebuttal. *See In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002). In the present case though, no such evidence appears in the record.

In essence, the rejection has actually attempted to assert (without actually saying so) a case of inherency. The assertion that in-phase orientation is part of Kramer's device could only be true if such features were inherent. Inherency cannot be established for this limitation of the claims. According to the Examiner's own reasoning, Kramer's pair of grating elements are only "*capable* of being arranged in phase," but are not necessarily required to do so. Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (emphases added); see also Section 2112(IV) of the MPEP. Whether a rejection is based on obviousness or anticipation, mere possibilities are not sufficient to establish a *prima facie* case. By definition, every invention would have been “possible” before it was patented. The rejection asserts nothing more than the fact that one prior art reference was “capable” of being modified to meet the claimed orientation. Section 2143.01(IV) of the MPEP, however, clearly states that an invention merely being within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness. Evidence is still

required that one of ordinary skill would have been motivated to make the asserted capabilities a reality. No such evidence appears on the record.

Accordingly, all of the language of the claims has not been given full patentable consideration, and thus the asserted case of obviousness is deficient on its face for being based on unsupported conclusory statements. All of the recited claim limitations are not taught or suggested in either of the cited references, taken alone or together. For at least these reasons therefore, the Board should reverse the rejection.

B. The Arguments Presented in Rebuttal to the Asserted *Prima Facie* Case Remain Unchallenged on the Record.

Even had a proper *prima facie* case of obviousness been established (which Applicant does not concede) this Board should conclude that the *prima facie* case had been sufficiently overcome based on Applicant's rebuttal. The outstanding rejection is based on obviousness, and not anticipation. The advantages that the present claims realize over the prior art are a factor that the Examiner was required to consider in rebuttal of the asserted *prima facie* case. Such advantages, when unchallenged on the record, will be sufficient to overcome the *prima facie* assertion. In the present case, the advantages of the present claims remain unchallenged on the record.

It is undisputed that the invention represented by claim 2 of the present Application will advantageously operate as a grating horn. Regardless of whether the "grating horn" limitations from the preamble are given patentable weight with respect to the asserted *prima facie* case of obviousness, there is no dispute in the record that the grating horn features of the invention are a clear advantage that neither of the cited references, whether taken alone or together, could realize. Advantages realized over the prior art are secondary considerations that need not even be affirmatively recited in the claims. Therefore, the grating horn features of pending claim 2 were at least sufficient to overcome the asserted *prima facie* case of obviousness on rebuttal. In the present case, however, it was error for the Examiner to fail to consider these advantages with respect to the rebuttal to the *prima facie* case.

Section 707.07(f) of the MPEP states:

If it is the examiner's considered opinion that the asserted advantages are not sufficient to overcome the rejection(s) of record, he or she should state the reasons for his or her position in the record, preferably in the action following the assertion or argument relative to such advantages. By so doing

the applicant will know that the asserted advantages have actually been considered by the examiner and, if appeal is taken, the Board of Patent Appeals and Interferences will also be advised.

The importance of answering applicant's arguments is illustrated by *In re Herrmann*, 261 F.2d 598, 120 USPQ 182 (CCPA 1958) where the applicant urged that the subject matter claimed produced new and useful results. The court noted that since applicant's statement of advantages was not questioned by the examiner or the Board of Appeals, it was constrained to accept the statement at face value and therefore found certain claims to be allowable. See also *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed. Cir. 1995) (Office failed to rebut applicant's argument).

In the present case, the record is clear that the grating horn features of the present claims have never been questioned. Nor is there any evidence on the record that either of the cited references, whether taken alone or together, could operate or function as a grating horn. Because the appeal is limited to the evidence of record, this Board is “constrained to accept the statement [of these advantages over the prior art] at face value,” and find claims 2-9 of the present Application allowable for at least these additional reasons.

II. THE REJECTION OF CLAIM 6 UNDER 35 U.S.C. 103(a) BASED UPON KRAMER AND WALSH, AND FURTHER IN VIEW OF HAMADA, SHOULD BE REVERSED.

The rejection of claim 6 based on the proposed combination of Kramer, Walsh, and Hamada is deficient for at least the reasons discussed above in traversing the rejection independent claim 2 based only on the proposed combination of Kramer and Walsh. Claim 6 depends from claim 2, and the addition of Hamada to the proposed combination fails to resolve the deficiencies, discussed above, from Kramer and Walsh. Additionally, no motivation has been asserted to justify the combination of Hamada with Kramer and Walsh.

A. All Limitations of the Claim Have Not Been Considered.

The asserted *prima facie* case of obviousness against claim 6 is deficient on its face for at least the reasons discussed above in traversing the rejection of claim 2. The rejection relies upon Hamada merely for its discussion of a vertex and a flat base, where the vertex does not intersect the flat base. Like Kramer and Walsh, Hamada similarly fails to teach or suggest anything regarding a grating horn, or orienting a pair of grating elements to be in phase. In fact, none of the three cited references even mentions a grating horn or in-phase

orientation for a pair of grating elements. For at least these reasons therefore, this Board should reverse the rejection of claim 6.

B. No Rationale Has Been Submitted to Support the Proposed Combination of References.

The Board should also reverse the rejection of claim 6 because no rationale has been submitted as to why one of ordinary skill in the art would be motivated to combine Hamada with Kramer and Walsh. In fact, the only "motivation" that is cited from Hamada has nothing to do with the proposed *combination* of references, and the record shows that there has never been any answer to Applicant's argument that the proposed combination would result in an unworkable device.

With respect to the cited "motivation," Applicant does not dispute that Hamada claims to result in a "sharp moire pattern" in its disclosure. This teaching is irrelevant to the proposed combination. The "sharp moire pattern" cited is relevant only to the teachings of Hamada by itself, and not to the proposed combination of Hamada with the other two references. Section 2143.01 of the MPEP states that the cited motivation must indicate the desirability of the proposed combination, and not merely the desirability of a particular reference by itself. By definition, every reference should indicate a desirability to implement its own teachings. Hamada simply does not teach or suggest that the cited "sharp moire pattern" will still result, or be somehow improved, *when combined* with either of Kramer and Walsh. Accordingly, the standard for combining references in an obviousness rejection, as established by Section 2143.01, have not been met, and the individual rejection of claim 6 is deficient on its face for at least these additional reasons.

Additionally, Applicant points out to the Board that there is no substantive answer or challenge on the record to Applicant's arguments that the proposed combination of Kramer, Walsh, and Hamada would yield an unworkable device. The only response to this argument that does appear on the record is the verbatim quote of the first two sentences of Section 2145(III) of the MPEP. These two sentences have no factual relationship to the issues of this case, and the Board should see that, when Section 2145(III) is considered in its entirety, the record contains no legal rebuttal to Applicant's arguments either.

Considered in its entirety, the express language of Section 2145(III) (the sentence following the two relied upon by the Examiner) is seen to additionally contain the explicit

caution "However, the claimed combination *cannot ... render the reference inoperable for its intended purpose.*" (Emphasis added, see also Section 2143.01 of the MPEP). According to this remainder of the entire Section 2145(III) therefore, the language quoted by the Examiner is not a challenge the argument that the proposed combination would be inoperable. Quite the contrary. Section 2145(III) clearly indicates that the inoperable device argument counters the "test" stated by the Examiner, and not vice versa. Kramer, Walsh, and Hamada disclose different structural geometries, and no rationale has been submitted on the record to explain how such different structures could be implemented together without rendering the proposed combination inoperable.

Accordingly, Applicant's additional arguments against the proposed combination of Hamada with Kramer and Walsh remain entirely unchallenged on the record, and thus the outstanding obviousness rejection of claim 6 has also been sufficiently rebutted to warrant withdrawal of the rejection for at least these reasons as well..

CLAIMS APPENDIX

Appellant attaches a copy of the claims involved in this appeal as an appendix hereto, on pages C1-C3.

EVIDENCE APPENDIX

Appellant submits herewith an Evidence Appendix following the Claims Appendix, as required pursuant revised 37 C.F.R. 41.37. The Evidence Appendix is found on page E-1.

RELATED PROCEEDINGS APPENDIX


Appellant submits herewith a Related Proceedings Appendix following the Evidence Appendix, as required pursuant revised 37 C.F.R. 41.37. The Related Proceedings Appendix is found on page R-1.

CONCLUSION

Appellants respectfully submit that at least claims 2-9 are all patentably distinct over the cited prior art of record. Other than the \$270.00 fee for submission of this Appeal Brief, no fees are believed due in connection with this Application. Nevertheless, the Commissioner is hereby authorized to charge any fees which may be deemed necessary to make this submission both timely and complete to Deposit Account Number 12-0600.

Respectfully submitted,

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CLAIMS APPENDIX TO APPEAL BRIEF

1. (Canceled)
2. (Original) A grating horn, comprising:
a flat base and a pair of grating elements attached to the base, each of the grating elements being ruled with a grating period, the grating elements oriented in phase and in substantial symmetry about a normal to the flat base, such that an electron beam interacting with the grating elements produces Terahertz radiation.
3. (Original) The grating horn of claim 2, the grating elements forming a V-groove and vertex to the flat base.
4. (Original) The grating horn of claim 3, each of the grating elements being ruled perpendicular to a face of the grating element.
5. (Original) The grating horn of claim 3, the vertex intersecting the flat base.
6. (Original) The grating horn of claim 3, the vertex non-intersecting the flat base, wherein rulings of the grating elements extend between the vertex and the flat base.
7. (Original) The grating horn of claim 3, the vertex comprising a flat portion.
8. (Original) The grating horn of claim 3, wherein rulings of the grating elements are parallel to the flat base.
9. (Original) The grating horn of claim 3, wherein each of the grating elements forms a bevel edge, wherein each of the grating elements is ruled between the bevel edge and the flat base.
10. (Previously Presented) A grating horn, comprising:
a flat base; and
a pair of grating elements attached to the flat base, each of the grating elements being ruled with a grating period, the grating elements oriented in phase and in substantial

symmetry about a normal to the flat base, such that an electron beam interacting with the grating elements produces Terahertz radiation,

wherein the grating elements form a V-groove and vertex to the flat base, and

wherein each of the grating elements comprises a triangle component and a rectangular component, wherein each of the grating elements is ruled in the triangular and rectangular components and parallel to the flat base.

11. (Previously Presented) A system for generating FIR laser radiation, comprising:

an electron source for generating an electron beam; and

a grating horn having a flat base and a pair of grating elements attached to the base, each of the grating elements being ruled with a grating period, the grating elements oriented in phase and in substantial symmetry about a normal to the flat base, such that the electron beam interacts with the grating elements to produce the FIR laser radiation.

12. (Withdrawn) The system of claim 11, further comprising optics to focus radiation scattered from the grating horn into a laser beam.

13. (Withdrawn) The system of claim 11, further comprising a chamber for housing the grating horn, and a window for transmitting the FIR radiation from inside the housing to outside of the housing.

14. (Withdrawn) A system for generating FIR laser radiation, comprising:

an electron source for generating an electron beam; and

a plurality of gratings, each of the gratings being positionable to a focus of the electron beam to interact with the electron beam to produce the FIR laser radiation, each of the gratings being ruled differently to modify emission wavelength of the FIR radiation;

wherein one or more of the plurality of gratings comprises a grating horn having a flat base and a pair of grating elements attached to the base, each of the grating elements being ruled with a grating period, the grating elements oriented in phase and in substantial symmetry about a normal to the flat base, such that the electron beam interacts with the grating elements to produce the FIR laser radiation.

15. (Canceled)
16. (Withdrawn) A method for generating FIR laser radiation, comprising:
generating an electron beam; and
focusing the electron beam to a grating horn, the grating horn comprising a flat base
and a pair of grating elements attached to the base, each of the grating
elements being ruled with a grating period, the grating elements oriented in
phase and in substantial symmetry about a normal to the flat base,
wherein interaction between the electron beam and the grating elements produces the
FIR laser radiation.
17. (Withdrawn) The method of claim 16, further comprising focusing the FIR
radiation into a laser beam with one or more optical elements.
18. (Canceled)

EVIDENCE APPENDIX TO APPEAL BRIEF

None.

RELATED PROCEEDINGS APPENDIX TO APPEAL BRIEF

None.